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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,977

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Helmut Kraus

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EXAMINER

KOEHLER, CHRISTOPHER M

ART UNIT

PAPER NUMBER

3726

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,977	<b>Applicant(s)</b> KRAUS, HELMUT	
	<b>Examiner</b> Christopher M. Koehler	<b>Art Unit</b> 3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :3/14/05, 5/23/05, 10/20/05, 12/11/06, 11/05/07, 11/09/07, 11/21/07, 9/15/08, 12/22/08, 3/16/09.

## DETAILED ACTION

### *Claim Objections*

1. Claims 10 and 16 are objected to because of the following informalities: in line 3 of both claims "are generated" should be deleted. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 9, 11-15 and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Asano et al. (US Patent No. 4,589,184).

#### Claims 9 and 15:

Asano teaches a method for mounting a plurality of add-on parts on a work piece (abstract), the add-on parts being attached to the work piece so as to be oriented with respect to one another in a precisely positioned fashion (figure 20), a mounted tool (80A, 80B) guided using a robot (col. 5, lines 35-56 and col. 6, line 52-col. 8, line 9) feeding and positioning each add-on part (2A, 2B), at least one of the mounting tools including a securing device (83A, 83B) for receiving the respective add-on part, a sensor system (150A, 150B) being fixedly connected to at least one of the mounting tools and having at least one sensor (153A, 153B, 154A, 154B, 155A, 155B), the method comprising the following steps: moving the mounting tools (80A, 80B) using an iterative closed-loop control process using measured values of the at least one sensors

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into a preliminary position (in synchronism with the carriage; col. 6, line 52-col. 7, line 40; the examiner notes that the components are moved relative to each other in response to the sensor signals compared with reference values controlling the robotic movement without outside intervention which constitutes an iterative closed-loop control), the add-on parts (2A, 2B) in the preliminary position (in synch with carriage) being held in the mounting tools and being oriented with respect to one another in a positioned fashion (both 80A and 80B are oriented with the carriage and therefore with each other), moving the mounting tools with the oriented add-on parts held therein from the preliminary position (in synch with carriage only) into a mounting position (in synch with carriage and positioned with the body opening 3A, 3B in line with the door 2A, 2B; col. 7, line 41-col. 8, line 9) with respect to the work piece (1), the add-on parts being connected to the work piece in the mounting position (col. 8, lines 3-6).

Claims 11 and 17:

Asano teaches that the moving into the mounting position step includes running a second iterative closed-loop control process to orient the add-on parts with respect to a reference area on the work piece in a positioned fashion using measured values of the at least one sensor (col. 7, line 41-col. 8, line 9 describes the mounting position control while col. 5, lines 35-56 and col. 6, line 52-col. 7, line 40 describes the preliminary position control).

Claims 12 and 18:

Asano teaches that after the preliminary position has been reached, movements of the robots are coupled (in synch with one another) so that when the mounting

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position is reached the positioned orientation of the add-on parts with respect to one another is retained.

Claims 13 and 19:

Asano teaches that the add-on parts are a driver door (2A) and a rear door (2'A) of a vehicle body (see figures 20-23), the driver door and rear door being oriented with respect to one another in a positioned fashion (in their respective openings as well as in the jig; figures 22 and 23) and being screwed securely to door openings in the vehicle body (col. 8, lines 36-39).

Claims 14 and 20:

Asano teaches that the work piece is a vehicle body (1).

Claims 21 and 22:

Asano teaches a mounting system for simultaneously mounting a plurality of add-on parts (2A, 2B) on a work piece (1) comprising: a plurality of robots (70A, 70B, 31), each fitted with a mounting tool (80A, 80B, car body mounted to 31) for receiving an add-on part (2A, 2B, 1); an open-loop control system having, for each robot, a processing program for open-loop controlling a path of the robot and for open-loop controlling a movement of the mounting tool (the control of the carriage 31 is independent and open-loop because it is subject to outside control while the control of the worktables 70A, 70B is dependent upon the movement of the carriage); a sensor system (150 A, 150B) including at least one sensor (153, 154, 155) fixedly connected to a first (70A) of the mounting tools wherein the at least one sensor is a metrically noncalibrated sensor (the sensors are uncalibrated image sensors; col. 5, lines 35-56),

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the at least one sensor being directed to a reference area of an add-on part held in a second of the mounting tools (col. 5, lines 35-56); and an evaluation unit for evaluating measured values of the sensor system (col. 6, line 52-col. 7, line 40).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Asano.

*Claim 23:*

Asano does not explicitly teach a TCP/IP interface for communication between the open-loop control system and the evaluation unit, however the examiner takes official notice that it is well known in the control art to use TCP/IP interfaces for communications between control system components and it would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated an TCP/IP interface into the control system of Asano in order to provide communication between control system components placed distally about the assembly station.

6. Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano in view of Yoshimi et al. (*Active, Uncalibrated Visual Servoing*, submitted by applicant by IDS).

*Claims 10 and 16:*

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Asano teaches that the iterative closed-loop control process includes the following control loop steps: generating actual measured values of the first and second sensors are generated (col. 5, lines 50-56), comparing the actual measured values with setpoint measured values generated during a set up phase (col. 5, lines 50-56), calculating a movement vector (control signal) of the first and second mounting tools from a difference between the actual measured values and the setpoint measured values (col. 5, lines 50-56) and moving the first and second mounting tools by an amount equal to the movement vector. Asano does not explicitly teach that the movement vector and measured values are determined using a Jacobian matrix. Yoshimi teaches using a Jacobian matrix (part 4, "estimating the image jacobian") in combination with uncalibrated image sensors comparing reference values with actual values to control robotic movement. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the Jacobian matrix of Yoshimi because the Jacobian matrix models the differential relationship between the image sensors and the robotic control system in order to accurately predict the effects of small changes in one system on the other (Yoshimi, part 4, lines 11-15).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Koehler whose telephone number is (571)272-3560. The examiner can normally be reached on Mon.-Fri. 7:30A-4:00P.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jermie E Cozart/  
Primary Examiner, Art Unit 3726

/C. M. K./  
Examiner, Art Unit 3726